## AMENDMENT TO THE CLAIMS

- **Format of Claim Amendments**

Applicants have amended the claims as indicated below. Pursuant to the revised format to 37 C.F.R. 1.121, Applicants herein submit only one version of the claims with markings to show changes. Detailed listings of all claims that are, or were in the application, are presented.

- **Statement with Respect to Scope of Amended and Non-Amended Claims**

Amendments to, cancellation of, and additions to, the claims are made in order to streamline prosecution of the case to embodiments that are presently anticipated to be of commercial significance, and are not made for a purpose of patentability. Any amendment, cancellation or addition made herein should not be construed in any manner as indicating Applicants' surrender of any subject matter of the application, or surrender of any equivalent to any element asserted in one or more claims. Applicants do not concede that the scope of the claims set forth below fail to extend as far as the original claims. Furthermore, any narrowing which may be evinced with respect to subject matter covered by the claims as a whole, or by one or more claims of the appended claims, when compared to claims previously in the application, should not be interpreted as indicating that the Applicants have generally disclaimed the territory between the original claimed subject matter and the amended claimed subject matter. Applicants intend each term of the claims set forth below to read with respect to the full-breadth of the language of the claims and to encompass the same equivalency as if the claims were originally presented in the application and request examination of the claims with respect to patentability to in accord Applicant's intent. Amended claim elements are to be construed to include

substantial equivalents known to those of ordinary skill in the art. Applicants assert that the amendments are made without prejudice and reserve all rights to prosecute any canceled claims, and claims preceding any amendment, and other disclosed (but not presently claimed) embodiments in the application, in future continuation applications, divisional applications, continuation-in-part applications, continuing prosecution applications, requests for continuing examination, re-examination applications and any other application claiming priority from or through the present application.

**COMPLETE LIST OF CLAIMS THAT ARE OR HAVE BEEN BEFORE THE OFFICE AFTER ENTRANCE OF THE AMENDMENTS MADE HEREIN**

(shown on the next page)

1. (ORIGINAL) A method of operating a CDMA cellular communications system comprising at least one macro cell having a macro cell base station and at least one micro cell having a micro cell base station, at least part of the micro cell being located within an area served by the macro cell base station, separate frequency bands normally required for simultaneous communication of data from said macro cell and micro cell base stations, which method comprises the steps of:

(1) receiving an electronic indication representative of the quality of service at one or more cellular communications device served by the macro cell base station;

(2) electronically processing the or each electronic indication to obtain a comparison with a predetermined threshold for said quality of service; and

(3) maintaining said quality of service above said predetermined threshold for any cellular communications device(s) served by the macro cell base station that is within a predetermined range of the micro cell base station by limiting the power of signals transmitted from the micro cell base station, whereby data may be transmitted and received in the micro and macro cells on substantially the same CDMA frequency band(s).

2. (Original) A method as claimed in claim 1, wherein those cellular communications device(s) within said predetermined range can be detennined by electronically processing signals representative of macro cell interference and micro cell interference at each

cellular communications device, the predetermined range being that distance at which micro cell interference is negligible in comparison with macro cell interference.

3. (CURRENTLY AMENDED) A method as claimed in claim 1 [[-2]], wherein said predetermined range is that distance from the micro cell base station at which micro cell interference is at least approximately 10dB less than macro cell interference.

4. (CURRENTLY AMENDED) A method as claimed in claim 1, ~~2 or 3~~, further comprising the steps of generating an electronic signal representative of said predetermined range, receiving respective electronic signals representative of the distance between said micro cell base station and the or each cellular communications device served by the macro cell, and processing said electronic signals so as to determine those cellular communications devices served by the macro cell that are within said predetermined range.

5. (ORIGINAL) A method as claimed in claim 4, wherein said electronic signals representative of the distance between said micro cell base station and the or each cellular communications device are obtained by the steps of determining respective estimated geographic position of the or each cellular communications device and processing said

estimated geographic position to determine a distance between said micro cell base station and the or each cellular communication device.

6. (CURRENTLY AMENDED) A method as claimed in claim 5 [[6]], further comprising the step of obtaining said respective estimated geographic position of the or each cellular communications device with a radiolocation method.

*7.*(CURRENTLY AMENDED) A method as claimed in ~~any preceding~~ claim 1, wherein the step (3) is carried out by electronically determining a tolerable micro cell base station power level for the or each cellular communications device served by the macro cell base station and instructing said micro cell base station to transmit all signals at a power substantially no higher than said tolerable level.

8. (ORIGINAL) A method as claimed in claim *7,* further comprising the steps of electronically determining a tolerable micro cell base station power level for all cellular communications devices served by the macro cell base station within said predetermined range, and electronically instructing said micro cell base station to transmit signals at a power substantially no higher than the lowest tolerable micro cell base station power that has been

determined for said cellular communications devices.

9.(CURRENTLY AMENDED)A method as claimed in claim 7 ~~or 8~~, wherein said tolerable micro cell base station power level is a fraction of the power of signals from the macro cell base station.

10.(CURRENTLY AMENDED)A method as claimed in claim 9, wherein for each cellular communications device said tolerable micro cell base station power is obtainable ~~by~~ from:

$$P_{MIC}^{MAX} = P_{MAC} \cdot \frac{L_{MAC}}{L_{MIC}} \left[ \frac{1}{SINR_{MIN}} - \frac{1}{SINR_0} \right]$$

where $P_{MIC}^{MAX}$ is the maximum tolerable micro cell base station power, $P_{MAC}$ is the transmitted power from the macro cell base station, $L_{MAC}$ and $L_{MIC}$ are the path loss from the macro cell and micro cell base stations respectively, $SINR_{MIN}$ corresponds to the minimum tolerable signal to interference plus noise ratio for each cellular communications device, and $SINR_0$ is the signal to interference plus noise ratio of the cellular communications device assuming there is no micro cell base station interference.

11. (CURRENTLY AMENDED) A method as claimed in ~~any preceding~~ claim 1, further comprising the step of electronically determining a residence time in said predetermined range for the or each cellular communications device served by the macro cell base station, said residence time being useable to substantially maintain the quality of service of said cellular communications device(s).

12. (CURRENTLY AMENDED) A method as claimed in ~~any preceding~~ claim 1, further comprising the step of substantially ceasing transmission of signals from said micro cell base station to cellular communications device(s) served thereby in order to substantially maintain the quality of service of cellular communications devices served by the macro cell base station that are within said predetermined range.

13. (CURRENTLY AMENDED) A method as claimed in claim 1 ~~11 or 12~~, further comprising the step of electronically instructing said micro cell base station to take over service of the or each cellular communications device within said predetermined range, enabling resumption or continuation of transmission and reception of signals to and from cellular communications devices served by the micro cell base station and/or macro cell base station.

14. (CURRENTLY AMENDED) A method as claimed in claim 1 [[13]], further comprising the step of ~~prioritising~~ prioritizing service from said micro cell base station to cellular communications devices requiring substantially real-time data above those requiring substantially non-real-time data.

15. (CURRENTLY AMENDED) A method as claimed in ~~any preceding~~ claim 1, further comprising the step of serving cellular communications device(s) from said macro cell base station with at least one adaptive antenna capable of directional transmission and/or reception, thereby enabling reduction in the necessary transmission power of said micro cell base station and cellular communications devices served thereby to achieve a given signal quality.

16. (CURRENTLY AMENDED) A method as claimed in ~~any preceding~~ claim 1, further comprising the step of electronically adjusting the data transmission rate to cellular communications devices served by the micro cell base station.

17. (CURRENTLY AMENDED) A method as claimed in claim 1 [[16]], further comprising the steps of electronically processing said electronic indication and a selected data transmission rate for each cellular communications device to determine a proportion of the maximum tolerable

micro cell base station power for that cellular communications device, until either all of said available micro cell base station power has been assigned or the total number of cellular communications devices been processed, ~~prioritising~~ prioritizing assignment of transmission power to cellular communications device(s) requiring substantially real-time data above those requiring substantially non-real time data, and transmitting data to each cellular communications device at the respective assigned transmission power.

18. (CURRENTLY AMENDED) [[A]] The method as claimed in claim 17, wherein said proportion for the ith cellular communications device is obtainable from:

$$\phi_i = \frac{(SINR)_i R_i (I_{inter} + I_{intra} + I_{interL} + N_0)}{\beta PC}$$

assuming the Gaussian approximation for multiple access interference, and where $SINR_i$ is the signal to interference plus noise ratio, $R$ is the transmission rate from the micro cell base station, $I_{inter}$, $I_{intra}$ and $I_{interL}$ are inter-cell, intra-cell and inter-layer interference components, respectively, $N_o$ is noise, $\beta$ is the user's path loss factor in real terms (not in dB), $P$ is the total output power from the micro cell base station, $C$ is the constant chip rate and where $0 \leq \varphi \leq 1$.

19. (CURRENTLY AMENDED) [[A]] The method as claimed in claim 17 ~~or 18~~, further comprising the step of electronically adjusting said selected data transmission rate if said electronic processing determines said proportion to be such that, on its own or when summed with proportion(s) calculated for any other cellular communications device(s), it exceeds said maximum tolerable micro base station transmission power, and re-performing said electronic calculation with said adjusted selected data rate.

20. (CURRENTLY AMENDED) A method as claimed in ~~any preceding~~ claim 1, further comprising the steps of electronically instructing buffering of data for cellular communications devices served by the micro cell base station, and adjusting the number of those cellular communications devices to which data is transmitted to increase the ability of the system to serve the remaining cellular communications devices being served by the micro cell base station.

21. (CURRENTLY AMENDED) ~~Computer operable control means~~ A computer operable controller for use with a CDMA cellular communications system comprising at least one macro cell having a macro cell base station and at least one micro cell having a micro cell base station, at least part of the micro cell being located within an area served by the macro cell base station, separate frequency bands normally required for simultaneous communication of data from said macro cell and micro cell base stations, the computer operable controller ~~means~~ comprising:

a receiver ~~means~~ for receiving an electronic indication representative of the quality of service at one or more cellular communications devices served by the macro cell base station; and

a processor ~~means~~ for electronically processing the or each electronic indication to obtain a comparison with a predetermined threshold for said quality of service;

whereby said computer operable controller ~~means for~~ can maintain~~ing~~ said quality of service above said predetermined threshold for any cellular communication device(s) served by the macro cell base station that is within a predetermined range of the micro cell base station by limiting the power of signals transmitted from the micro cell base station, whereby data may be the transmitted and received in the micro and macro cells on substantially the same CDMA frequency bands.

22. (CURRENTLY AMENDED) ~~Computer operable control means~~ A computer operable controller as claimed in claim 21, ~~further comprising means~~ said processor for determining those cellular communications device(s) within said predetermined range y electronically processing signals representative of macro cell interference and micro cell interference at said cellular communications device(s), the predetermined range being that distance at which micro cell interference is negligible in comparison with macro cell interference.

23. (CURRENTLY AMENDED) ~~Computer operable control means~~ A computer operable controller as claimed in claim 22, wherein said predetermined range is that distance from the micro cell base station at which micro cell interference is at least approximately 10dB less than macro cell interference.

24. (CURRENTLY AMNEDED) ~~Computer operable control means~~ A computer operable controller as claimed in claim 21, ~~22 or 23~~, further comprising ~~means~~ a generator for generating ~~an~~ respective electronic signals representative of ~~said predetermined range~~ the distance between said micro cell base station and the or each cellular communications device served by the macro cell, ~~and means~~ said processor for processing said electronic signals so as to determine those cellular communications devices served by the macro cell that are within said predetermined range.

25. (CURRENTLY AMNEDED) Computer operable control means A computer operable controller as claimed in claim 24, wherein said generator means for generating electronic signals representative of the distance between said micro cell base station and the or each cellular communication can receive an electronic signal representative of a respective estimated geographic position of the or each cellular communications device and can process said signal to determine a distance between said micro cell base station and the or each cellular communication device.

26. (CURRENTLY AMENDED) ~~Computer operable control means~~ A computer operable controller as claimed in claim 25, further comprising a position estimator means for obtaining

said respective estimated geographic position of the or each cellular communications device by a radiolocation method.

27. (CURRENTLY AMENDED) ~~Computer operable control means~~ A computer operable controller as claimed in ~~any of claims~~ claim 21 ~~to 26~~, further comprising ~~means~~ said processor for determining a tolerable micro cell base station power level for the or each cellular communications device served by the macro cell base station and means for instructing said micro cell base station to transmit all signals at a power substantially no higher than said tolerable level.

28. (CURRENTLY AMENDED) ~~Computer operable control means~~ A computer operable controller as claimed in claim 27, further comprising ~~means~~ said processor for determining a tolerable micro cell base station power level for all cellular communications devices served by the macro cell base station within said predetermined range, ~~and means~~ whereby said computer operable controller instructs ~~for instructing~~ said micro cell base station to transmit signals at a power substantially no higher than the lowest tolerable micro cell base station power that has been determined for said cellular communications devices.

29. (CURRENTLY AMNEDED) ~~Computer operable control means~~ A computer operable controller as claimed in claim 27 ~~or 28~~, wherein said ~~means for determining a tolerable micro~~

~~cell base station power level~~ processor can, in use, determine said tolerable micro cell base station power as a fraction of the power of signals from the macro cell base station.

30. (CURRENTLY AMNEDED) ~~Computer operable control means~~ A computer operable controller as claimed in claim 29, wherein for each cellular communications device said tolerable micro cell base station power is obtainable from:

$$P_{MIC}^{MAX} = P_{MAC} \cdot \frac{L_{MAC}}{L_{MIC}} \left[ \frac{1}{SINR_{MIN}} - \frac{1}{SINR_0} \right]$$

where $P_{MIC}^{MAX}$ is the maximum tolerable micro cell base station power, $P_{MAC}$ is the transmitted power from the macro cell base station, $L_{MAC}$ and $L_{MIC}$ are the path loss from the macro cell and micro cell base stations respectively, $SINR_{MIN}$ corresponds to the minimum tolerable signal to interference plus noise ratio for each cellular communications device, and $SINR_0$ is the signal to interference plus noise ratio of the cellular communications device assuming there is no micro cell base station interference.

31. (CURRENTLY AMENDED) ~~Computer operable control means~~ A computer operable controller as claimed in claims 21 ~~to 30~~, further comprising ~~means~~ said processor for

determining a residence time in said predetermined range for the or each cellular communications device served by the macro cell base station, said residence time being useable to substantially maintain the quality of service of said cellular communications device(s).

32. (CURRENTLY AMENDED) ~~Computer operable control means~~ A computer operable controller as claimed in claim 21, further comprising ~~means~~ said processor for ceasing transmission of signals from said micro cell base station to cellular communications device(s) served thereby to substantially maintain the quality of service of cellular communications devices served by the macro cell base station and/or micro cell base station.

33.(CURRENTLY AMENDED) ~~Computer operable control means~~ A computer operable controller as claimed in claim ~~30 or~~ 32, further comprising ~~means~~ said processor for instructing said micro cell base station to take over service of the or each cellular communications device within said predetermined range, enabling resumption or continuation of transmission and reception of signals to and from cellular communications devices served by the micro cell base station.

34.(CURRENTLY AMENDED) ~~Computer operable control means~~ A computer operable

controller as claimed in claim ~~13~~ 21, further comprising ~~means~~ said processor for ~~prioritising~~ prioritizing service from said micro cell base station to cellular communications devices requiring substantially real-time data above those requiring substantially non-real-time data.

35. (CURRENTLY AMENDED) ~~Computer operable control means~~ A computer operable controller as claimed in claims ~~31 to 34~~, further comprising a controller ~~means~~ for controlling at least one adaptive antenna capable of directional transmission and/or reception, thereby enabling reduction in the necessary transmission power of said micro cell base station and cellular communications devices served thereby to achieve a given signal quality.

36. (CURRENTLY AMENDED) ~~Computer operable control means~~ A computer operable controller as claimed in claim 21 ~~to 35~~, further comprising ~~means~~ said processor for adjusting the data transmission rate to cellular communication devices served by the micro cell base station.

37. (CURRENTLY AMENDED) ~~Computer operable control means~~ A computer operable controller as claimed in claim 36, further comprising ~~means~~ said processor for

(a) electronically processing said electronic indication and a selected data transmission rate for each cellular communications device to determine a proportion of the maximum tolerable micro

cell base station power for that cellular communications device, until either all of said available micro cell base station power has been assigned or the total number of cellular communications devices been processed, ~~means~~

(b) for ~~prioritising~~ prioritizing assignment of transmission power to cellular communications device(s) requiring substantially real-time data above those requiring substantially non-real-time data, and ~~means~~

(c) for instructing transmission of data to each cellular communications device at the respective assigned transmission power.

38.(CURRENTLY AMENDED) ~~Computer operable control means~~ A computer operable controller as claimed in claim 37, wherein said proportion for the *i*th cellular communications device is obtainable from:

$$\phi_i = \frac{(SINR)_i R_i (I_{inter} + I_{intra} + I_{interL} + N_0)}{\beta PC}$$

assuming the Gaussian approximation for multiple access interference, and where $SINR_i$ is the signal to interference plus noise ratio, $R$ is the transmission rate from the micro cell base station, $I_{inter}$ , $I_{intra}$ and $I_{interL}$ are inter-cell, intra-cell and inter-layer interference components respectively, $N_o$ is noise, $\beta$ is the user's path loss factor in real terms (not in dB), $P$ is the total output power from the micro cell base station, $C$ is the constant chip rate and where $0 \leq \varphi \leq 1$.

39. (CURRENTLY AMENDED) ~~Computer operable control means~~ A computer operable controller as claimed in claim 37, further comprising ~~means~~ said processor for electronically adjusting said selected data transmission rate if said ~~electronic processing~~ processor determines said proportion to be such that, on its own or when summed with proportion(s) calculated for any other cellular communications device(s), it exceeds said maximum tolerable micro base station transmission power, and means for re-performing said electronic calculation with said adjusted data rate.

40. (CURRENTLY AMENDED) ~~Computer operable control means~~ A computer operable controller as claimed in claim 21, further comprising ~~means~~ a buffer for buffering data for cellular communications devices served by the micro cell base station, ~~and means~~ said processor for adjusting the number of those cellular communications devices to which data is transmitted to increase the ability of the system to serve the remaining cellular communications devices being served by the micro cell base station.

41. (CURRENTLY AMENDED) A base station controller comprising a ~~computer operable control means~~ computer operable controller as claimed in ~~any of~~ claims 21 ~~to 40~~.

42. (CURRENTLY AMENDED) A computer readable medium storing computer executable instructions for carrying out a method according to ~~any of claims~~ claim 1 ~~to 20~~.

43. (CURRENTLY AMENDED) A computer program comprising program instructions for causing a computer, ~~for example~~ such as a base station controller, to carry out the method of claim ~~any of claims~~ 1 ~~to 20~~.

44. (CURRENTLY AMENDED)A computer program comprising program instructions for causing a computer, ~~for example~~ such as a macro cell base station controller, to perform the method steps of claim ~~any of claims~~ 1 ~~to 13~~.

45. (CURRENTLY AMENDED)A computer program comprising program instructions for causing a computer, ~~for example~~ such as a micro cell base station controller, to perform the method steps of claim ~~any of claims~~ 11 ~~to 20~~.

46. (CURRENTLY AMENDED) A CDMA communications system comprising ~~computer operable control means~~ a computer operable controller as claimed in claim ~~any of claims~~ 21 ~~to 40~~, at least one macro cell base station, and at least one micro cell base station having at least a part of the micro cell within the area served by said macro cell base station~~, said CDMA communications system being operable in accordance with a method as claimed in any of claims 1 to 20~~.

47. (CURRENTLY AMENDED) A method of operating a cellular communications system comprising at least one macro cell having a macro cell base station and at least one micro cell having a micro cell base station, at least part of the micro cell being located within an area served by the macro cell base station, which method comprises the steps of prioritizing ~~prioritising~~ transmission of data to a first group of cellular communications devices served by the micro cell base station that require substantially real-time data above a second group of cellular communications devices that require substantially non-real-time data, by assigning a fraction of available micro cell base station power to each cellular communications device based on the signal to interference plus noise ratio of each device, starting with those in said first group, either until all of said available micro cell base station power is assigned or until all of said cellular communication devices have been assigned a fraction; and transmitting data to said first and/or second groups of cellular communications devices based on said fractions.

48. (CURRENTLY AMENDED) A system ~~method~~ as claimed in claim 46, wherein said fraction for the *i*th cellular communications device is obtainable from:

$$\phi_i = \frac{(SINR)_i R_i (I_{inter} + I_{intra} + I_{interL} + N_0)}{\beta PC}$$

assuming the Gaussian approximation for multiple access interference, and where

$SINR_i$ is the signal to interference plus noise ratio, $R$ is the transmission rate from the micro cell base station, $I_{inter}$ , $I_{intra}$ and $I_{interL}$ are inter-cell, intra-cell and inter-layer interference components respectively, $No$ is noise, $\beta$ is the user's path loss factor in real terms (not in dB), $P$ is the total output power from the micro cell base station, $C$ is the constant chip rate and where $0 \leq \varphi \leq 1$.